Remarks

Applicants and their representatives wish to thank Examiner Young for the thorough examination of the present application and the detailed explanations in the Office Action dated October 9, 2009. New Claims 31-47 have been added, and Claims 1, 3, 27, and 29 have been amended. No new matter has been introduced by the present Amendment.

The Rejection of Claims 1-3 under 35 U.S.C. § 101

The rejection of Claims 1-3 under 35 U.S.C. § 101 has been obviated by appropriate amendment.

The Rejection of Claims 1, 2, and 27-30 under 35 U.S.C. § 102(e)

The rejection of Claims 1, 2, and 27-30 under 35 U.S.C. § 102(e) as being anticipated by Lee et al. (U.S. Pat. No. 5,748,789) is respectfully traversed.

Lee discloses a method implemented in an object-based video encoder or decoder that uses shape information to describe the boundary of a group of pixels representing an object in a sequence of video frames to identify transparent blocks (see, e.g., the Abstract of Lee). In the object-based video coding method, encoders code shape separately from motion and texture, and shape information is available before the encoder/decoder codes/decodes texture and motion data (see, e.g., the Abstract of Lee). The encoder and decoder use this shape information to identify transparent macroblocks or blocks so that texture coding and possible motion coding can be skipped (see, e.g., the Abstract of Lee). Thus, the method for transparent block skipping identified by Lee reduces coding and decoding operations and reduces the number of bits needed to store a bitstream representing a compressed video sequence (see, e.g., the Abstract of Lee).

As further disclosed in Lee, a function block 158 indicates that pixels between interior outline 148 and exterior outline 156 are classified according to predefined attributes as to whether they are within object interior 144, thereby to automatically identify object perimeter 142 and a corresponding mask 80 of the type described with reference to FIG. 3A (see, e.g., col.

12, ll. 43-48 of Lee). Preferably, the image attributes include pixel color and position, but either attribute could be used alone or with other attributes (see, e.g., col. 12, ll. 48-50 of Lee).

In the preferred embodiment, each of the pixels in interior outline 148 and exterior outline 156 define a "cluster center" represented as a five-dimensional vector in the form of (r, g, b, x, y) (see, e.g., col. 12, ll. 51-54 of Lee). The terms r, g, and b correspond to the respective red, green, and blue color components associated with each of the pixels, and the terms x and y correspond to the pixel locations (see, e.g., col. 12, ll. 54-58 of Lee). The m-number of cluster center vectors corresponding to pixels in interior outline 148 are denoted as $\{I_0, I_1, \ldots, I_{m-1}\}$, and the n-number of cluster center vectors corresponding to pixels in exterior outline 156 are denoted as $\{O_0, O_1, \ldots, O_{n-1}\}$ (see, e.g., col. 12, ll. 58-62 of Lee).

Pixels between the cluster center vectors I_i and O_j are classified by identifying the vector to which each pixel is closest in the five-dimensional vector space (see, e.g., col. 12, ll. 62-64 of Lee). For each pixel, the absolute distance d_i and d_j to each of respective cluster center vectors I_i and O_j is computed according to the following equations:

$$D_i = w_{color}(|r-r_i| + |g-g_i| + |b-b_i|) + w_{coord}(|x-x_i| + |y-y_i|),\ 0 \le i < m,$$

$$D_j = w_{color}(|r-r_j| + |g-g_j| + |b-b_j|) + w_{coord}(|x-x_j| + |y-y_j|),\ 0 \le j < n,$$

in which w_{color} and w_{coord} are weighting factors for the respective color and pixel position information (see, e.g., col. 12, line 64 – col. 13, line 5 of Lee). Weighting factors w_{color} and w_{coord} are of values having a sum of 1 and otherwise selectable by a user (see, e.g., col. 13, ll. 5-7 of Lee). Preferably, weighting factors w_{color} and w_{coord} are of an equal value of 0.5 (see, e.g., col. 13, ll. 7-8 of Lee). Each pixel is associated with object interior 144 or exterior according to the minimum five-dimensional distance to one of the cluster center vectors I_i and O_j (see, e.g., col. 13, ll. 8-11 of Lee).

Thus, Lee discloses a method of object segmentation and tracking that utilizes a single classification step to distinguish between interior and exterior pixels (e.g., those within object interior 144 and those that are not) (see, e.g., col. 11, ll. 54-59). However, Lee is silent with regard to utilizing a first binary probability model to encode each of a plurality of classes, and

utilizing a second binary probability model to further encode a first class, wherein each of a plurality of regions assigned a first symbol or a second symbol is assigned to the first class, and each of a plurality of regions assigned a third symbol is assigned to a second class, as recited in Claim 1. Additionally, Lee is silent with regard to a computer-readable medium that, when executed by a processor, causes a processor to utilize a first binary probability model to encode each of a plurality of classes, and utilize a second binary probability model to further encode a first class, wherein each of a plurality of regions assigned a first symbol or a second symbol is assigned to the first class, and each of a plurality of regions assigned a third symbol is assigned to a second class, as recited in Claim 27. Furthermore, Lee is silent with regard to an apparatus comprising a first means for encoding each of a plurality of classes, the first means for encoding utilizing a first binary probability model, and a second means for further encoding the first class, the second means for encoding utilizing a second binary probability model, as recited in Claim 29. Thus, Claims 1, 27, and 29 are not anticipated by Lee, and the rejection under 35 U.S.C. § 102(e) should be withdrawn.

Claims 2, 28, and 30 depend from Claims 1, 27, and 29, respectively, and are therefore not anticipated for at least reasons similar to that of Claims 1, 27, and 29, respectively, as discussed above. For reasons similar to those discussed above, new independent Claim 39 and all claims dependent therefrom are not anticipated by Lee. Therefore, this ground of rejection is unsustainable and should be withdrawn.

Conclusions

In view of the above amendments and remarks, all bases for objection and rejection are overcome, and the application is in condition for allowance. Early notice to that effect is earnestly requested.

In view of the above amendments and remarks, all bases for rejection are overcome, and the application is in condition for allowance. Early notice to that effect is earnestly requested.

Respectfully submitted,

/Andrew D. Fortney/

Andrew D. Fortney, Ph.D.
Reg. No. 34,600

215 W. Fallbrook Avenue, Suite 203
Fresno, California 93711
(559) 432 – 6847

ADF:arj